1) Basic Description of Data Set(s). This must provide a detailed description of the data sets that will be produced by this ARC component. The description must include:

DATA SET #1: IR satellite data & IR-derived precipitation estimates

A- 3-hourly & daily global (60N-60S) precipitation estimates from IR data. Intermediate (and archived) products include: Globally merged histograms of IR brightness temperatures from GOES (east & west), Meteosat (5 & 7) and GMS (currently GOES-9) that are collected individually by the various satellite operators (3-hourly) ; histograms of OLR data (converted from flux to brightness temperature) from all available NOAA polar orbiting satellites; pixel-resolution IR data from all geostationary satellites each ½ hour.

B- Satellite IR & OLR data

C- Global (60N-60S)

D- For the IR-derived precip. estimates & IR histogram data:
   a. pentad mean, 2.5 x 2.5 lat/lon
   b. 3-hourly, 1 x 1 lat/lon
   c. ~ 4 km, 1/hourly (IR full resolution data)

E- a. 1986-present
   b. 1997- present
   c. 1998 – present

F- a. assembled from 3-hourly data each pentad
   b. twice-daily
   c. every ½ hour

G- IR-derived precipitation estimates available from CPC web site (http://www.cpc.ncep.noaa.gov/products/global_precip/html/web.html)
   IR histogram data available by request from CPC

H-Data are used to make final GPCP estimates for GEWEX

2*) Scientific Stewardship Activities Required for Continued Production of the Climate-Quality Data Set*

A- Careful comparisons of internal-consistency of geo-IR data revealed a viewing angle dependence in the data which has been quantified, published and used routinely to mitigate that dependence. Data have been compared with independent & polar-orbiter

data periodically. The ISCCP intercalibration coefficients are used (when available) to account for differences in the spectral response of the various sensors since the peak frequencies vary from 10.7 to 11.5 microns. As a backup, research has been conducted that has resulted in a separate scheme to intercalibrate the IR data by comparing IR BT's at collocated areas in satellite overlap regions (after the viewing angle correction has been applied) but this requires full-res IR imagery to get stable statistics & thus can only be used for 1998-present which is the period for which global IR at full-res is available.

B- ISCCP intercalibration coefficients are used to help reduce bias in the IR data. Precipitation validation activities by the GPCP Surface Reference Data Center provides feedback for the resulting IR-derived precipitation estimates.

C- we are presently reprocessing the full-res global IR archive to make the entire record homogeneous; to date the reprocessing has covered the period February 2000 through November 2001 and will continue until data through November 2002 have been reprocessed.

D- Yelena Yarosh at CPC inspects all products visually and appropriate action is taken after a consensus decision is made. This may involve requesting the satellite operators to check their products and resend, or create the spatially averaged GPCP IR products from the full-res IR data set.

E- John.janowiak@noaa.gov

DATA SET #2: CMAP global precipitation analyses

A – Global (90N-90S) precipitation estimates created by merging gauge observations, satellite estimates of precipitation (IR and passive microwave) and precipitation fields generated by the NCEP/NCAR reanalysis. CMAP is a merged product like the GPCP merged product although the input data sets and the scheme to merge the data are different. The reason for using an alternative merging methodology is to assess the impact of input data sources and analysis procedures on the resulting products.

B - Satellite IR & passive microwave data, OLR data, land scf. Rain gauge data, and the reanalysis precipitation fields;

C - Global (90N-90S)

D - pentad & monthly mean, 2.5 x 2.5 lat/lon

E - 1979-present

F – updated approximately on a quarterly basis governed by the availability of gauge data and satellites estimates from outlying centers

G – ftp://ftpprd.ncep.noaa.gov/pub/precip/products/global_precip/cmap

H- Used extensively in the research community – many research papers confirm this. Used by GPCP to assess the impact of data merging methodologies on the final merged analysis, and as the basis for making the GPCP pentad estimates.

2*) Scientific Stewardship Activities Required for Continued Production of the Climate-Quality Data Set*

A- Precipitation estimates that are provided by internal & external sources are viewed to ensure consistency & the algorithm developers are contacted if necessary to rectify the situation.

B- CMAP uses rain gauges over land to adjust the satellites estimates and the South Pacific atoll rain gauge data to remove bias from satellite estimates over oceans.

C- Reprocessing is planned in the coming fiscal year.

D- See “A” above

E- Pingping.Xie@noaa.gov

DATA SET #3: GPCP pentad global precipitation analyses

A – Global (90N-90S) precipitation estimates created by adjusting the pentad CMAP analysis against the monthly GPCP data set so that the overall magnitude is close to that in the monthly GPCP while the sub-monthly variations in the pentad CMAP is retained. The GPCP pentad precipitation analysis is part of the GPCP official products suite.

B - Satellite IR & passive microwave data, OLR data, land scf. Rain gauge data, and the reanalysis precipitation fields;

C - Global (90N-90S)

D - pentad mean, 2.5 x 2.5 lat/lon

E - 1979-present

F – standard version of the data set is updated approximately on a quarterly basis, while a real-time version is produced automatically one day after the last day of the pentad period.

G – through ftp at: ftpprd.ncep.noaa.gov/pub/precip

H- Used extensively in the research community to examine intraseasonal variability and by many operational centers to verify climate forecasts.

2*)* *Scientific Stewardship Activities Required for Continued Production of the Climate-Quality Data Set*

A- Precipitation estimates have been verified by comparison with independent gauge observations and satellite-based estimates.

B- The pentad GPCP analysis is defined by adjusting the pentad CMAP merged analysis against the monthly GPCP merged analysis.

C- Reprocessing is planned in the coming fiscal year.

D- See “A” above

E- Pingping.Xie@noaa.gov

DATA SET #4: Reconstructed global precipitation analyses

A – Global (75N-60S) precipitation back to 1948 that have been "reconstructed" by using the statistical relationship between rainfall over continents and rainfall over the oceans.

B - Satellite OLR data, land sfc. rain gauge data

C - Global (75N-60S)

D - Monthly mean, 2.5 x 2.5 lat/lon

E - 1948-present

F – updated approximately on a quarterly basis.

G – Available through ftp at: ftpprd.ncep.noaa.gov/pub/precip.

H- Used for research purposes. The primary utility of these analyses is to determine rainfall patterns over oceanic areas during both phases of the ENSO cycle in the pre-satellite era.

2*) Scientific Stewardship Activities Required for Continued Production of the Climate-Quality Data Set*

A-Extensive QC has been conducted on the land surface rain gauge data sets to ensure that the statistical relationships with oceanic rainfall are valid. This includes examining consistency of the historical records for each gauge, comparing time series with nearby gauge observations, and conducting impact tests for observations at some suspicious gauge stations.

B- Bias is assumed to be small compared to the uncertainty in the magnitude of the precipitation estimates produced by this method. The greatest utility of the data set in qualitatively access the precipitation anomaly pattern associated with the evolution of ENSO events has been demonstrated by several recent studies.

C- No reprocessing is currently underway.

D- See "A" above

E- Pingping.Xie@noaa.gov

DATA SET #5: CMORPH global precipitation analyses

A – Very high time-space resolution global (60N-60S) precipitation analyses beginning Dec 1, 2002 that are acquired by merging passive microwave derived precipitation estimates that use IR data to move and morph the precipitation features.

B - Satellite IR & passive microwave estimates of precipitation.

C - Global (60N-60S)

D - ½ hourly, 0.072 x 0.072 degrees lat/lon (~8 km at the equator)

E - December 1, 2002 -present

F – updated in real-time

G – Most recent 10-days available at:
ftp://ftpprd.ncep.noaa.gov/pub/precip/global_CMORPH

H- Used for research purposes and for real-time monitoring.

2*) Scientific Stewardship Activities Required for Continued Production of the Climate-Quality Data Set*

A-Extensive work has been and continues to be done to:

1. Merge the various passive microwave-derived precipitation estimates and to normalize them to a standard to avoid discontinuities.
2. Develop models to reduce viewing angle dependencies particularly for the AMSU-B sensor
3. Troubleshoot snow & ice screens so that erroneous precip. Areas over snow covered surfaces are not interpreted as precipitation
4. Develop a model to reduce precipitation over semi-arid regions where precipitation can evaporate substantially before reaching the surface

B- Bias is known to be substantial over semi-arid regions in satellite precipitation estimates and a model is being constructed to address that issue. A process to validate these (and other) estimates over the US, Australia and Europe provides bias information that has and will be useful for bias correction.

C- No reprocessing is currently underway.

D- See “A” above

E- john.janowiak@noaa.gov

3) Funding Request

This should identify resources required to continue the production of the data set(s) as described in parts 1) and 2) above, i.e., proven, tested methods and procedures. It is expected that resources required for substantial research investments leading to the development of new products or new analysis techniques will be provided from sources outside the ARC, including the competitive research proposals of the broader C^2D^2Program. However, it is expected that continual improvements to algorithms for quality control, bias detection, interpolation methods, etc. will be part of the ARC components.

A-	John Janowiak (20% of time):	no cost
	Pingping Xie (50% of time):	no cost
	Yelena Yarosh (85% of time):	70K
	Mingyue Chen (50% of time):	50K
	Robert Joyce (40% of time):	61K

		181K
B-	publish 2 papers @ 1.5K each	3K
	Travel (ARC meeting & 1 domestic Scientific meeting)	4K

		188K

C- Funding has historically come from OGP.

4) Transition of ARC Project to Operational Center

Processing and archive only at NOAA Center; PI performing Sceintific Data Stewardship oversight as needed.